

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.350	Preferred Cover Depth (m)	0.500
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.006	5.00	5.750	450	492385.678	100451.881	0.740
S2	0.003	5.00	5.650	450	492393.000	100456.293	0.750
S3	0.003	5.00	5.570	450	492394.842	100464.157	0.780
S4	0.008	5.00	5.610	450	492388.525	100467.859	0.907
S5	0.030	5.00	5.580	1200	492389.684	100472.808	1.500
S6	0.013	5.00	5.150	1200	492395.820	100499.744	1.250
S7			4.840	1200	492388.657	100508.148	1.050
S8	0.006	5.00	5.650	300	492371.526	100465.117	0.600
S9	0.006	5.00	5.650	450	492374.179	100476.440	0.796

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1	S2	8.549	0.600	5.010	4.900	0.110	77.7	100	5.16	50.0
1.001	S2	S3	8.077	0.600	4.900	4.790	0.110	73.4	100	5.31	50.0
1.002	S3	S4	7.322	0.600	4.790	4.703	0.087	84.2	100	5.46	50.0
1.003	S4	S5	5.083	0.600	4.703	4.650	0.053	95.9	100	5.57	50.0
1.004	S5	S6	27.626	0.600	4.080	3.900	0.180	153.5	225	6.00	50.0
1.005	S6	S7	11.042	0.600	3.900	3.790	0.110	100.0	225	6.14	50.0
2.000	S8	S9	11.630	0.600	5.050	4.854	0.196	59.3	100	5.19	50.0
2.001	S9	S5	15.925	0.600	4.854	4.536	0.318	50.1	100	5.44	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	0.874	6.9	0.8	0.640	0.650	0.006	0.0	23	0.581
1.001	0.899	7.1	1.2	0.650	0.680	0.009	0.0	29	0.677
1.002	0.839	6.6	1.6	0.680	0.807	0.012	0.0	34	0.696
1.003	0.785	6.2	2.7	0.807	0.830	0.020	0.0	46	0.761
1.004	1.053	41.9	8.4	1.275	1.025	0.062	0.0	68	0.826
1.005	1.307	52.0	10.2	1.025	0.825	0.075	0.0	67	1.019
2.000	1.002	7.9	0.8	0.500	0.696	0.006	0.0	21	0.639
2.001	1.091	8.6	1.6	0.696	0.944	0.012	0.0	29	0.835

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S1	492385.678	100451.881	5.750	0.740	450		0	1.000	5.010	100
S2	492393.000	100456.293	5.650	0.750	450		1	1.000	4.900	100
S3	492394.842	100464.157	5.570	0.780	450		0	1.001	4.900	100
S4	492388.525	100467.859	5.610	0.907	450		1	1.002	4.790	100
S5	492389.684	100472.808	5.580	1.500	1200		0	1.002	4.790	100
S6	492389.684	100472.808	5.580	1.500	1200		1	1.002	4.703	100
S7	492389.684	100472.808	5.580	1.500	1200		0	1.003	4.703	100
S8	492389.684	100472.808	5.580	1.500	1200		1	2.001	4.536	100
S9	492389.684	100472.808	5.580	1.500	1200		2	1.003	4.650	100
S10	492395.820	100499.744	5.150	1.250	1200		0	1.004	4.080	225
S11	492395.820	100499.744	5.150	1.250	1200		1	1.004	3.900	225
S12	492395.820	100499.744	5.150	1.250	1200		0	1.005	3.900	225
S13	492388.657	100508.148	4.840	1.050	1200		1	1.005	3.790	225
S14	492371.526	100465.117	5.650	0.600	300					
S15	492371.526	100465.117	5.650	0.600	300		0	2.000	5.050	100
S16	492374.179	100476.440	5.650	0.796	450		1	2.000	4.854	100
S17	492374.179	100476.440	5.650	0.796	450		0	2.001	4.854	100

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.350	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	40	0	0

Node S6 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	3.900	Product Number	CTL-SHE-0067-2000-1029-2000
Design Depth (m)	1.029	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node S5 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	4.080
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	192

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	35.0	0.0	0.800	35.0	0.0	0.801	0.0	0.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.72%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	11	5.033	0.023	0.8	0.0074	0.0000	OK
15 minute winter	S2	11	4.928	0.028	1.2	0.0067	0.0000	OK
15 minute winter	S3	11	4.824	0.034	1.6	0.0079	0.0000	OK
15 minute winter	S4	11	4.752	0.049	2.6	0.0163	0.0000	OK
60 minute winter	S5	45	4.165	0.085	5.3	2.9662	0.0000	OK
60 minute winter	S6	44	4.172	0.272	4.4	0.3636	0.0000	SURCHARGED
15 minute summer	S7	1	3.790	0.000	1.9	0.0000	0.0000	OK
15 minute winter	S8	11	5.072	0.022	0.8	0.0058	0.0000	OK
15 minute winter	S9	11	4.884	0.030	1.6	0.0092	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.000	S2	0.8	0.508	0.117	0.0135	
15 minute winter	S2	1.001	S3	1.2	0.588	0.170	0.0165	
15 minute winter	S3	1.002	S4	1.6	0.527	0.242	0.0223	
15 minute winter	S4	1.003	S5	2.6	0.724	0.425	0.0184	
60 minute winter	S5	1.004	S6	3.4	0.203	0.082	0.7397	
60 minute winter	S6	Hydro-Brake®	S7	1.9				7.9
15 minute winter	S8	2.000	S9	0.8	0.507	0.102	0.0186	
15 minute winter	S9	2.001	S5	1.6	0.827	0.186	0.0307	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.72%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	5.047	0.037	2.0	0.0120	0.0000	OK
15 minute winter	S2	10	4.947	0.047	3.0	0.0111	0.0000	OK
15 minute winter	S3	11	4.845	0.055	3.9	0.0129	0.0000	OK
15 minute winter	S4	11	4.807	0.104	6.4	0.0349	0.0000	SURCHARGED
60 minute winter	S5	60	4.424	0.344	11.9	11.9621	0.0000	SURCHARGED
60 minute winter	S6	60	4.423	0.523	4.8	0.7001	0.0000	SURCHARGED
15 minute summer	S7	1	3.790	0.000	1.9	0.0000	0.0000	OK
15 minute winter	S8	10	5.084	0.034	2.0	0.0093	0.0000	OK
15 minute winter	S9	10	4.903	0.049	4.0	0.0151	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.000	S2	2.0	0.634	0.288	0.0267	
15 minute winter	S2	1.001	S3	2.9	0.733	0.412	0.0321	
15 minute winter	S3	1.002	S4	3.8	0.610	0.583	0.0447	
15 minute winter	S4	1.003	S5	6.3	0.842	1.025	0.0372	
60 minute winter	S5	1.004	S6	3.3	0.204	0.080	1.0987	
60 minute winter	S6	Hydro-Brake®	S7	1.9				19.2
15 minute winter	S8	2.000	S9	2.0	0.644	0.251	0.0358	
15 minute winter	S9	2.001	S5	3.9	1.047	0.453	0.0591	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.72%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	12	5.084	0.074	3.6	0.0239	0.0000	OK
15 minute winter	S2	12	5.067	0.167	5.4	0.0398	0.0000	SURCHARGED
15 minute winter	S3	12	5.013	0.223	6.0	0.0527	0.0000	SURCHARGED
180 minute winter	S4	168	4.975	0.272	3.1	0.0910	0.0000	SURCHARGED
180 minute winter	S5	168	4.974	0.894	9.4	27.9856	0.0000	SURCHARGED
180 minute winter	S6	168	4.974	1.074	2.6	1.4378	0.0000	FLOOD RISK
15 minute summer	S7	1	3.790	0.000	1.9	0.0000	0.0000	OK
15 minute winter	S8	10	5.097	0.047	3.6	0.0128	0.0000	OK
180 minute winter	S9	168	4.975	0.121	1.8	0.0375	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.000	S2	3.6	0.711	0.520	0.0601	
15 minute winter	S2	1.001	S3	4.4	0.748	0.630	0.0632	
15 minute winter	S3	1.002	S4	6.0	0.762	0.904	0.0573	
180 minute winter	S4	1.003	S5	3.1	0.753	0.503	0.0398	
180 minute winter	S5	1.004	S6	2.0	0.205	0.049	1.0987	
180 minute winter	S6	Hydro-Brake®	S7	2.0				43.9
15 minute winter	S8	2.000	S9	3.6	0.731	0.453	0.0564	
180 minute winter	S9	2.001	S5	1.8	0.855	0.210	0.1246	